

### Claims

What is claimed is:

1. A composite material for use with wallboards, said composite material

comprising:

a nonwoven mat; and

a reinforcing fabric layer bonded to one side of said nonwoven mat;

wherein said composite material is sufficiently open to allow gypsum slurry to flow therethrough.

2. The composite material set forth in claim 1, wherein said nonwoven mat is made of material selected from the group consisting of polyester, mineral fibers, polyolefin, glass, basalt, polyamides, and any combination thereof.

3. The composite material set forth in claim 2, wherein said polyester nonwoven mat selected from the group consisting of: carded, needlepunched, spunlaced, spunbonded, meltblown, airlaid, hydroentangled and any combination thereof.

4. The composite material set forth in claim 1, wherein said reinforcing fabric layer is made of material selected from the group consisting of mineral fiber, glass, basalt, polyester, polyolefin, polyamides, and any combination thereof.

5. The composite material set forth in claim 4, wherein said glass fabric includes continuous glass yarns.

6. The composite material set forth in claim 1, wherein said mat and said fabric are bonded together using an adhesive selected from the group consisting of polyacrylates, polyvinyl acetate, polyvinyl alcohol, polyvinyl chloride, polyolefin, styrene butadiene rubber, acrylic adhesive, polyvinylidene chloride, and any combination thereof.

7. The composite material set forth in claim 1, wherein said mat and said fabric are heat bonded together.

8. The composite material set forth in claim 1, wherein said mat and said fabric are ultrasonically bonded together.

9. The composite material set forth in claim 1, wherein said fabric is selected from the group consisting of woven fabric, knitted fabric, adhesively bonded fabric.

10. The composite material set forth in claim 1, wherein said mat has a weight in the range of 0.25 ounces per square yard and 2.0 ounces per square yard.

11. The composite material set forth in claim 10, wherein said mat has a weight in the range of 0.5 ounces per square yard to 1.5 ounces per square yard.

12. The composite material set forth in claim 1, wherein said reinforcing fabric layer has a yarn density of between 1 thread per inch and 20 threads per inch.

13. The composite material set forth in claim 12, wherein said reinforcing fabric layer has a yarn density of between 4 threads per inch and 10 threads per inch.

5 14. The composite material set forth in claim 1, wherein yarn size in said reinforcing fabric is in the range between 40 and 4000 denier.

15. The composite material set forth in claim 14, wherein said yarn size in said reinforcing fabric is in the range between 150 and 2000 denier.

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16. The composite material set forth in claim 15, wherein said yarn size in said reinforcing fabric is in the range between 220 and 1300 denier.

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17. The composite material set forth in claim 1, further comprising a second nonwoven mat attached to said reinforcing fabric, so that said nonwoven mats sandwich said reinforcing fabric therebetween.

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18. A wallboard comprising:

an integral matrix of set cementitious material extending from one face of the board to the other face of the board; and

a composite material including a nonwoven mat and a reinforcing fabric layer bonded together, wherein said composite material is embedded in one of said faces so

that a continuous film of said cementitious material extends over an outer face of said composite.

19. The wallboard set forth in claim 18, wherein said nonwoven mat is made of material selected from the group consisting of polyester, mineral fiber, polyolefin, glass, basalt, polyamides, and any combination thereof.

20. The wallboard set forth in claim 19, wherein said polyester nonwoven mat is carded.

21. The wallboard set forth in claim 18, wherein said reinforcing fabric layer is made of material selected from the group consisting of glass, mineral fiber, basalt, polyester, polyolefin, polyamides, and any combination thereof.

22. The wallboard set forth in claim 21, wherein said glass fabric includes continuous glass yarns.

23. The wallboard set forth in claim 18, wherein said mat and said fabric are bonded together using an adhesive selected from the group consisting of polyacrylates, polyvinyl acetate, polyvinyl alcohol, polyvinyl chloride, polyolefin, styrene butadiene rubber, acrylic adhesive, polyvinylidene chloride, and any combination thereof.

24. The wallboard set forth in claim 18, wherein said mat and said fabric are heat bonded together.

25. The wallboard set forth in claim 18, wherein said mat and said fabric are ultrasonically bonded together.

26. The wallboard set forth in claim 18, wherein said cementitious material is selected from the group consisting of gypsum, concrete, mineral wool, rock wool, and any combination thereof.

27. The wallboard set forth in claim 18, further comprising a second layer of said composite material wherein said second layer of composite material is embedded in an opposite face from said first layer of composite material, so that a continuous film of said cementitious material extends over an outer face of said second layer of composite material.

28. The wallboard set forth in claim 18, wherein said fabric is selected from the group consisting of woven fabric, knitted fabric, and adhesively bonded fabric.

29. The wallboard set forth in claim 18, wherein said reinforcing fabric layer has a yarn density of between 1 thread per inch and 20 threads per inch.

30. The wallboard set forth in claim 29, wherein said reinforcing fabric layer has a yarn density of between 4 threads per inch and 10 threads per inch.

31. The wallboard set forth in claim 18, wherein yarn size in said reinforcing fabric is in the range between 40 and 4000 denier.

5 32. The wallboard set forth in claim 31, wherein said yarn size in said reinforcing fabric is in the range between 150 and 2000 denier.

33. The wallboard set forth in claim 32, wherein said yarn size in said reinforcing fabric is in the range between 220 and 1300 denier.

10 34. The wallboard set forth in claim 18, wherein said composite is oriented in said wallboard so that said nonwoven mat is facing an outer face of said wallboard, and said reinforcing fabric layer is facing inwardly toward a core of said set cementitious material.

15 35. A method for manufacturing wallboard, said method comprising the steps of:  
bonding a nonwoven mat to a reinforcing fabric layer to form a composite material;  
providing an aqueous cementitious slurry, and bringing said composite material into contact with said slurry; and  
20 allowing said cementitious slurry to flow through and penetrate said composite material to form a continuous film extending over an outer face of said composite material.

36. The method set forth in claim 35, further comprising the step of providing a second layer of composite material, and embedding said second layer of composite material on an opposite side of said cementitious slurry from said first layer of composite material.

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37. The method set forth in claim 35, wherein said nonwoven mat is made of material selected from the group consisting of polyester, mineral fiber, polyolefin, glass, basalt, polyamides, and any combination thereof.

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38. The method set forth in claim 37, wherein said polyester nonwoven mat is carded.

39. The method set forth in claim 35, wherein said reinforcing fabric layer is made of material selected from the group consisting of glass, mineral fiber, basalt, polyester, polyolefin, polyamides, and any combination thereof.

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40. The method set forth in claim 39, wherein said glass fabric includes continuous glass yarns.

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41. The method set forth in claim 35, wherein said mat and said fabric are bonded together using an adhesive selected from the group consisting of polyacrylates, polyvinyl acetate, polyvinyl alcohol, polyvinyl chloride, polyolefin, styrene butadiene rubber, acrylic adhesive, polyvinylidene chloride, and any combination thereof.

42. The method set forth in claim 35, wherein said mat and said fabric are heat bonded together.

43. The method set forth in claim 35, wherein said mat and said fabric are ultrasonically bonded together.

44. The method set forth in claim 35, wherein said cementitious material is selected from the group consisting of gypsum, concrete, mineral fibers, and any combination thereof.

45. The method set forth in claim 35, wherein said fabric is selected from the group consisting of woven fabric, knitted fabric, and adhesively bonded fabric.

46. The method set forth in claim 35, wherein said reinforcing fabric layer has a yarn density of between 1 thread per inch and 20 threads per inch.

47. The method set forth in claim 46, wherein said reinforcing fabric layer has a yarn density of between 4 threads per inch and 10 threads per inch.

48. The method set forth in claim 35, wherein yarn size in said reinforcing fabric is in the range between 40 and 4000 denier.

49. The method set forth in claim 48, wherein said yarn size in said reinforcing fabric is in the range between 150 and 2000 denier.



50. The method set forth in claim 49, wherein said yarn size in said reinforcing fabric is in the range between 220 and 1300 denier.

- 5 51. The method set forth in claim 35, further including the step of orienting the composite material so that said nonwoven mat is facing an outer face of said wallboard, and said reinforcing fabric layer is facing inwardly toward a core of said set cementitious material.